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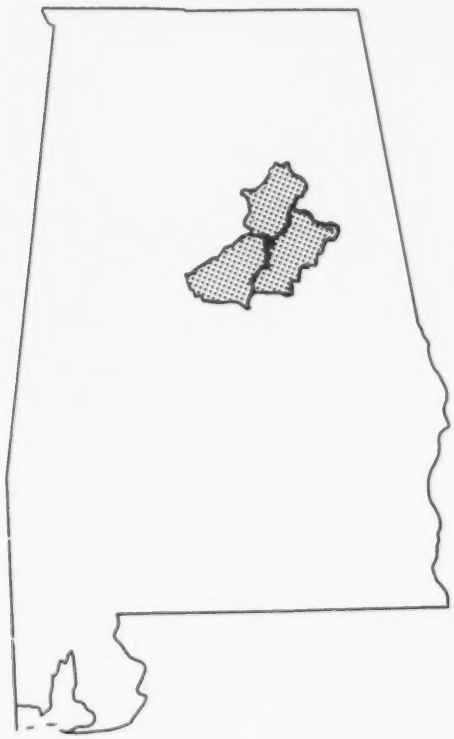
FLOOD INSURANCE STUDY

TOWN OF VINCENT, ALABAMA

SHELBY, TALLADEGA AND ST. CLAIR COUNTIES



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DECEMBER 15, 1980

federal emergency management agency
federal insurance administration

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1 2 Authority and Acknowledgments	1
	1.3 Coordination	1
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2 3 Principal Flood Problems	4
	2 4 Flood Protection Measures	4
3.0	ENGINEERING METHODS	4
	3.1 Hydrologic Analyses	5
	3.2 Hydraulic Analyses	5
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	6
	4.1 Flood Boundaries	7
	4.2 Floodways	7
5.0	INSURANCE APPLICATION	10
	5.1 Reach Determinations	10
	5.2 Flood Hazard Factors	10
	5.3 Flood Insurance Zones	11
	5.4 Flood Insurance Rate Map Description	11

TABLE OF CONTENTS - continued

		Page
6.0	OTHER STUDIES	11
7.0	LOCATION OF DATA	13
8.0	BIBLIOGRAPHY AND REFERENCES	13

FIGURES

Figure 1 - Vicinity Map 3

Figure 2 - Floodway Schematic 9

TABLES

Table 1 - Summary of Discharges 5

Table 2 - Floodway Data 8

Table 3 - Flood Insurance Zone Data 12

EXHIBITS

Exhibit 1 - Flood Profiles

Spring Creek/Blue Spring Branch/Tributary Two Panels - 01-02P
Upper Spring Creek Panel - 03P

Exhibit 2 - Flood Boundary and Floodway Map Index

Exhibit 3 - Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWN OF VINCENT, ALABAMA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Vincent, Shelby, Talladega and St. Clair Counties, Alabama and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Town of Vincent to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Law Engineering Testing Company for the Federal Insurance Administration, under Contract No. H-4636. This study was completed in September 1979.

1.3 Coordination

The Consultation Coordination Officer, appointed by the FIA, organized the first community meeting, held on March 1, 1978. This meeting, attended by representatives of Vincent, FIA, and Law Engineering Testing Company, was held to explain the nature and purpose of the Flood Insurance Study. Streams requiring detailed study were identified at this meeting.

A legal notice announcing the beginning of the study and stating its objective was placed in the Shelby County Reporter for a period of three weeks.

Contact was maintained during the course of this study with the Alabama Development Office, the Mobile District of the U.S. Army Corps of Engineers (COE), the United States Geological Survey and the Town of Vincent.

On July 29, 1980, the results of the Flood Insurance Study were reviewed at a final CCO meeting attended by personnel of Law Engineering Testing company, FIA and representatives of the Town of Vincent. The study was acceptable to the community

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the Town of Vincent, Alabama. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed study in Vincent were determined by FIA with community and study contractor consultation at the meeting in Pelham Alabama, on March 1, 1978.

Flooding caused by overflow of three streams was studied in detail. Spring Creek from the U.S Highway 231 bridge to the confluence of Blue Spring Branch, Blue Spring Branch to the confluence of Tributary Two, and Tributary Two to the northwest corporate limits were studied as one continuous stream. In addition, the upper portion of Spring Creek above the confluence of Blue Spring Branch was studied as a separate tributary.

2.2 Community Description

Vincent is located approximately 40 miles southeast of Birmingham, Alabama, in eastern Shelby County and in portions of St. Clair and Talladega Counties. The community developed around the intersection of U.S. Highway 231, the Southern Railway, and the Seaboard Coastline Railroad. Vicent has an incorporated area of about 18 square miles and a population of approximately 1700.

The economy of Vincent dependson industry and agriculture. Industrial or manufactured products include plastic binders and notebooks, metal building components, and iron plating. Agriculture products include corn and soy beans. Cotton is processed locally at the Vincent cotton gin. (Reference 1).

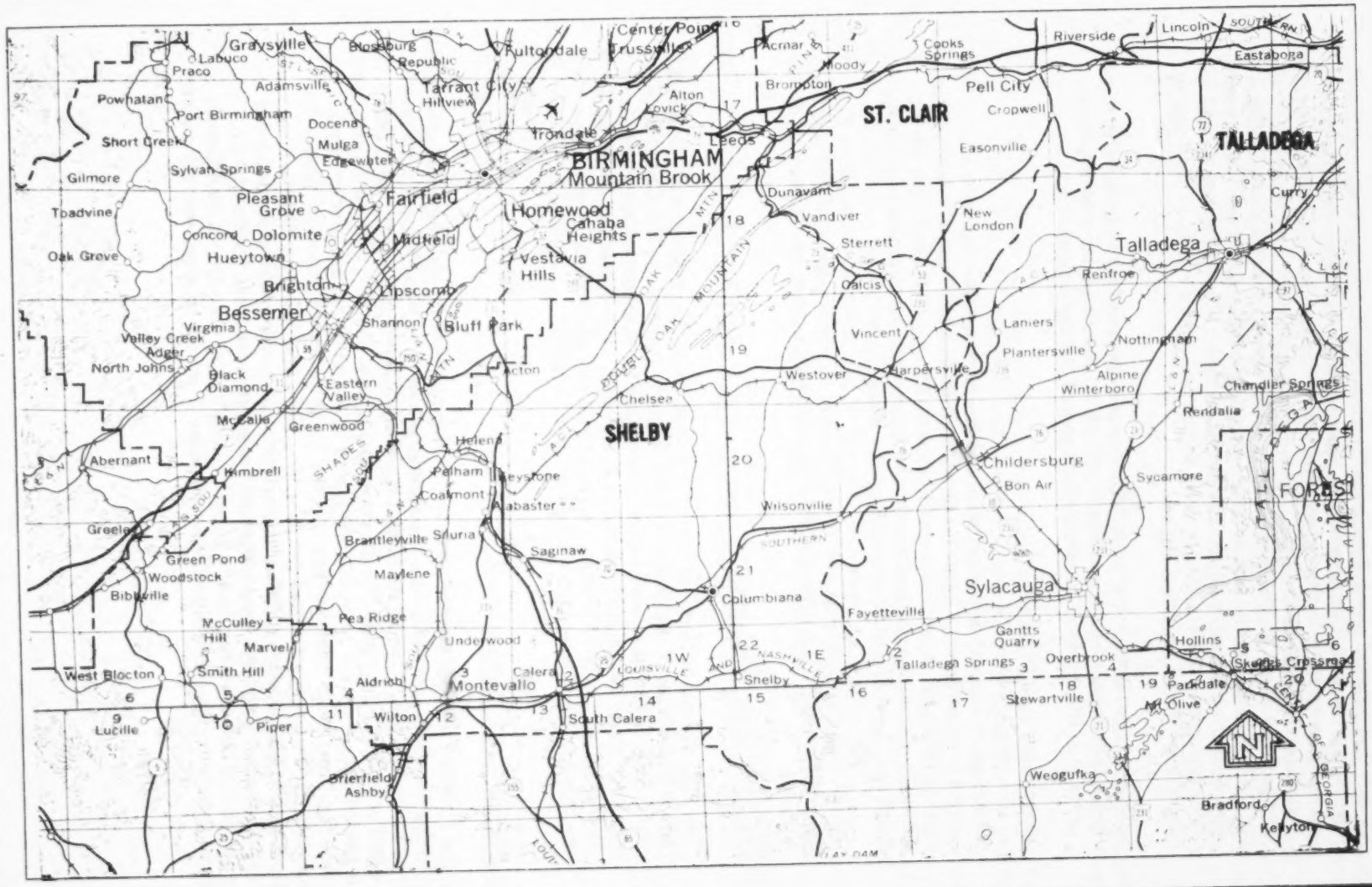


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF VINCENT, AL
(SHELBY, ST. CLAIR AND TALLADEGA COUNTIES)

APPROXIMATE SCALE
8 0 8 16 24 MILES

VICINITY MAP

Vincent is located along the Coosa River in the Ridge and Valley physiographic province. The community lies primarily in Shelby County; however, its corporate limits extend east of the Coosa River into St. Clair and Talladega Counties. Ground surface elevations within the corporate limits range from a low of 396 feet above the National Geodetic Vertical Datum of 1929 (NGVD) at the Coosa River to a high of about 720 feet NGVD near the western corporate limits of Vincent. Land use in the Spring Creek drainage area consists of primarily forest and pasture land. There are no significant areas of urbanization.

Vincent has a temperate climate. The average annual rainfall in the region is approximately 53 inches. Mean temperatures range from about 80 degrees F in the summer to about 48 degrees F in the winter.

2.3 Principal Flood Problems

Flooding in Vincent is due primarily to the backup of water behind the culvert where Spring Creek flows under the Southern Railway approximately 300 feet downstream of the confluence of Spring Creek and Blue Spring Branch. During large floods water backs up and floods pasture and crop land upstream of the Southern Railway embankment.

Other flooding problems in Vincent are due to low topography and poorly drained areas. After heavy rains water stands in these low areas and drains slowly.

2.4 Flood Protection Measures

The risk of severe flooding from the Coosa River has been greatly reduced due to the series of Alabama Power Company dams along the Coosa River from near Gadsden to well below Vincent. At the present time, there are no other flood protection measures in Vincent. There are two small lakes in the Spring Creek drainage area but their storage volume is not large enough to affect flows from larger rainfall events.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare

flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Stream flow records were not available for Spring Creek or any of its tributaries. Therefore, flood flow frequency equations applicable to small streams in Alabama were used to determine the 10-, 50-, and 100-year flood flows. These equations, developed by Olin and Bingham (Reference 2), are based on watershed drainage area and slope. Results of these equations were extrapolated using a least squares fit to provide estimates of the 500-year flows. The 10-, 50-, 100-, and 500-year flows for Vincent streams are summarized in Table 1, "Summary of Discharges".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SPRING CREEK					
At US Highway 231	11.6	2,360	3,760	4,400	5,730
Just above confluence of Blue Spring Branch	3.5	1,010	1,560	1,820	2,350
BLUE SPRING BRANCH					
At mouth	6.7	1,680	2,600	3,010	3,900
Just above confluence of Tributary 1	5.2	1,460	2,220	2,570	3,310
TRIBUTARY TWO					
At mouth	1.5	630	930	1,050	1,340
At pipeline crosing	1.0	500	700	800	1,010

3.2 Hydraulic Analyses

Hydraulic analyses were carried out to provide estimates of the elevation of floods of selected recurrence intervals along each stream studied in detail.

Cross sections for the backwater analyses were obtained from aerial photographs taken in March 1978. The below-water sections were obtained by field measurement. All bridges and culverts were field checked to obtain elevations and structural geometry. Cross sections were located at close intervals above and/or below bridges and culverts in order to compute the backwater effects of these structures. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and on the Flood Boundary and Floodway Map (Exhibit 3).

Channel roughness factors (Manning's "n") for the backwater computations were assigned on the basis of field inspection of flood plain areas Manning's "n" values for Vincent flood plains range from 0.04 to 0.15 and from 0.035 to 0.04 for the channels. Aerial photographs obtained during the course of aerial photogrametric surveying were used in conjunction with field inspection (Reference 3).

Flood profiles were drawn to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Water-surface elevations of the selected floods were computed utilizing the COE HEC-2 step backwater computer program (Reference 4). The detail study streams in Vincent were modeled continuously from downstream to upstream based on drainage area. The main stream for modeling purposes was considered the stream with the larger drainage area at a stream confluence. The main stream in the Vincent model consisted of Spring Creek, Blue Spring Branch and Tributary Two. The upper portion of Spring Creek (above the confluence with Blue Spring Branch), was considered a tributary to the main stream. Starting water-surface elevations for the main stream were computed using the slope-area method. Starting water-surface elevations for the upper portion of Spring Creek were computed independently of the backwater effects of the main stream using the slope-area method. The backwater elevation of the main stream near the mouth of Blue Spring Branch was superimposed on the upper Spring Creek profile upstream to the point where, the two profiles crossed.

All elevations are referenced to NGVD. Elevation reference marks used in the study are shown and described on the maps.

The hydraulic analyses for this study assumed unobstructed flow through all bridges and culverts. Thus, the flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:6000 with a contour interval of 4 feet (Reference 5). In cases where the 100- and the 500 year flood boundaries are close together, only the 100-year boundary has been shown.

Small areas within the flood boundaries may lie above the flood elevations, and therefore, amy not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Spring Creek/Blue Spring Branch/ Tributary Two								
A	60	170	1,370	3.4	422.1	422.1	423.0	0.9
B	2,140	90	650	6.7	422.8	422.8	423.2	0.4
C	3,310	230	3,910	1.1	437.6	437.6	438.1	0.5
D	5,100	530	5,730	0.5	437.7	437.7	438.2	0.5
E	6,970	210	1,270	2.0	437.8	437.8	438.4	0.6
F	8,560	90	460	5.6	442.0	442.0	442.6	0.6
G	10,680	70	460	5.2	451.1	451.1	451.7	0.6
H	11,430	200	750	1.4	453.7	453.7	454.3	0.6
I	13,620	150	590	1.8	468.4	468.4	468.9	0.5
J	17,710	80	250	3.2	496.9	496.9	497.6	0.7
K	20,750	40	170	4.8	520.8	520.8	521.7	0.9
Upper Spring Creek								
A	830	180	760	2.4	437.5	426.7[2]	427.4	0.7
B	2,760	670	1,270	1.4	437.5	430.6[2]	431.1	0.5
C	3,010	190	820	2.2	437.5	434.4[2]	435.0	0.6
D	4,190	190	570	3.2	437.7	437.7[2]	438.3	0.6

[1]Feet above centerline of U.S. Highway 231 for Spring Creek/Blue Spring Branch/Tributary Two; Feet above confluence with Spring Creek/Blue Spring Branch/Tributary Two for Upper Spring Creek.
[2]Elevations computed without consideration of backwater effects from Spring Creek/Blue Spring Branch/ Tributary Two.

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

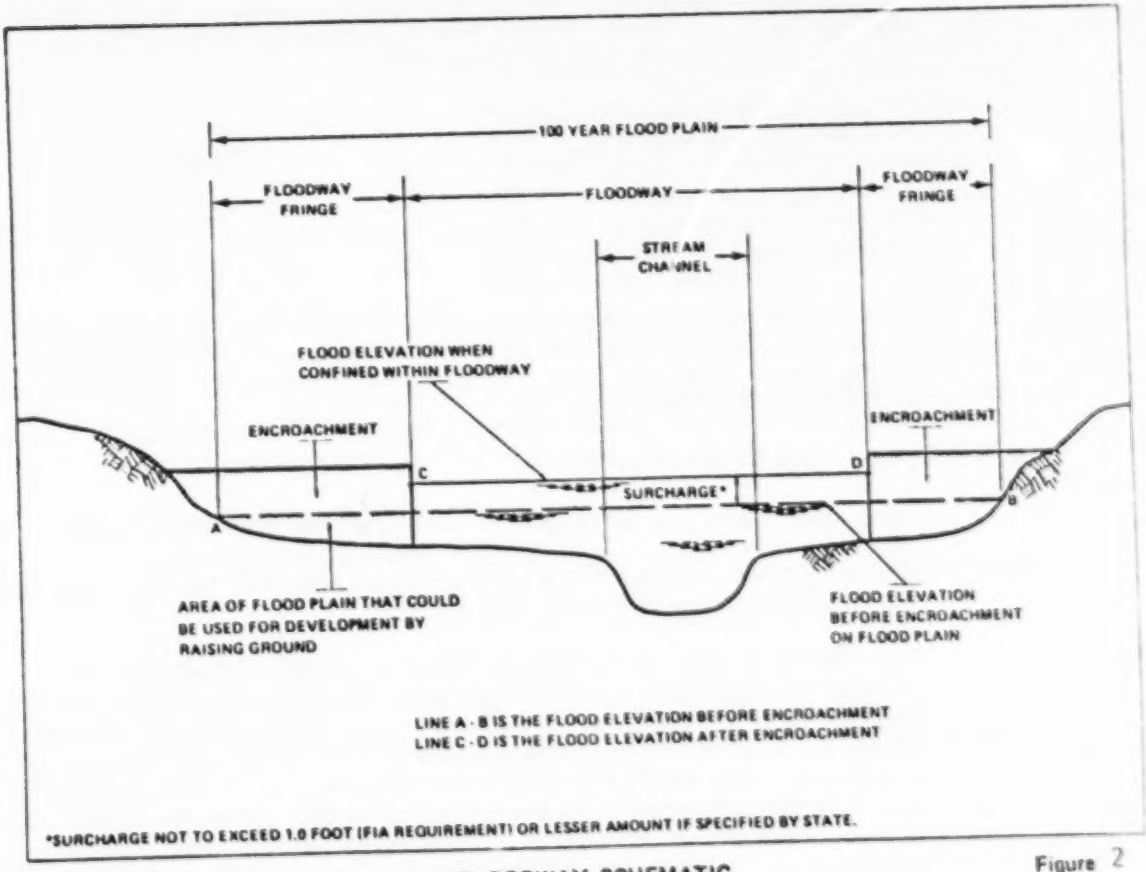
TOWN OF VINCENT, AL
(SHELBY, TALLEDEGA AND ST. CLAIR COS.)

FLOODWAY DATA

SPRING CREEK-BLUE SPRING BRANCH-TRIBUTARY TWO
UPPER SPRING CREEK

floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the Town of Vincent.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Four reaches meeting these criteria were required for the flooding sources of Vincent. These are located on the main stream of Spring Creek/Blue Spring Branch/Tributary Two. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Vincent was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A2, A4, A5, A12:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Vincent is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

This study is authoritative for the purposes of the Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations. Flood Insurance Studies for areas near Vincent in Shelby County exist and are applicable.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Spring Creek/Blue Spring Branch/ Tributary Two							
Reach 1	3	-2.4	-0.6	+0.9	025	A5	Varies
Reach 2	3	-6.2	-2.1	+4.4	060	A12	438
Reach 3	3	-1.8	-0.6	+1.7	020	A4	Varies
Reach 4	3	-0.8	-0.3	+0.5	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF VINCENT, AL
(SHELBY, TALLEDEGA AND ST. CLAIR COS.)

FLOOD INSURANCE ZONE DATA

SPRING CREEK-BLUE SPRING BRANCH-TRIBUTARY TWO

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data may be found at the office of the Federal Emergency Management Agency, Insurance and Mitigation Division, 1375 Peachtree Street, N.E., Suite 778, Atlanta, Georgia 30309.

8.0 BIBLIOGRAPHY AND REFERENCES

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Chow, Ven Te, Open Channel Hydraulics, McGraw Hill Book Company, Inc., New York, 1959.

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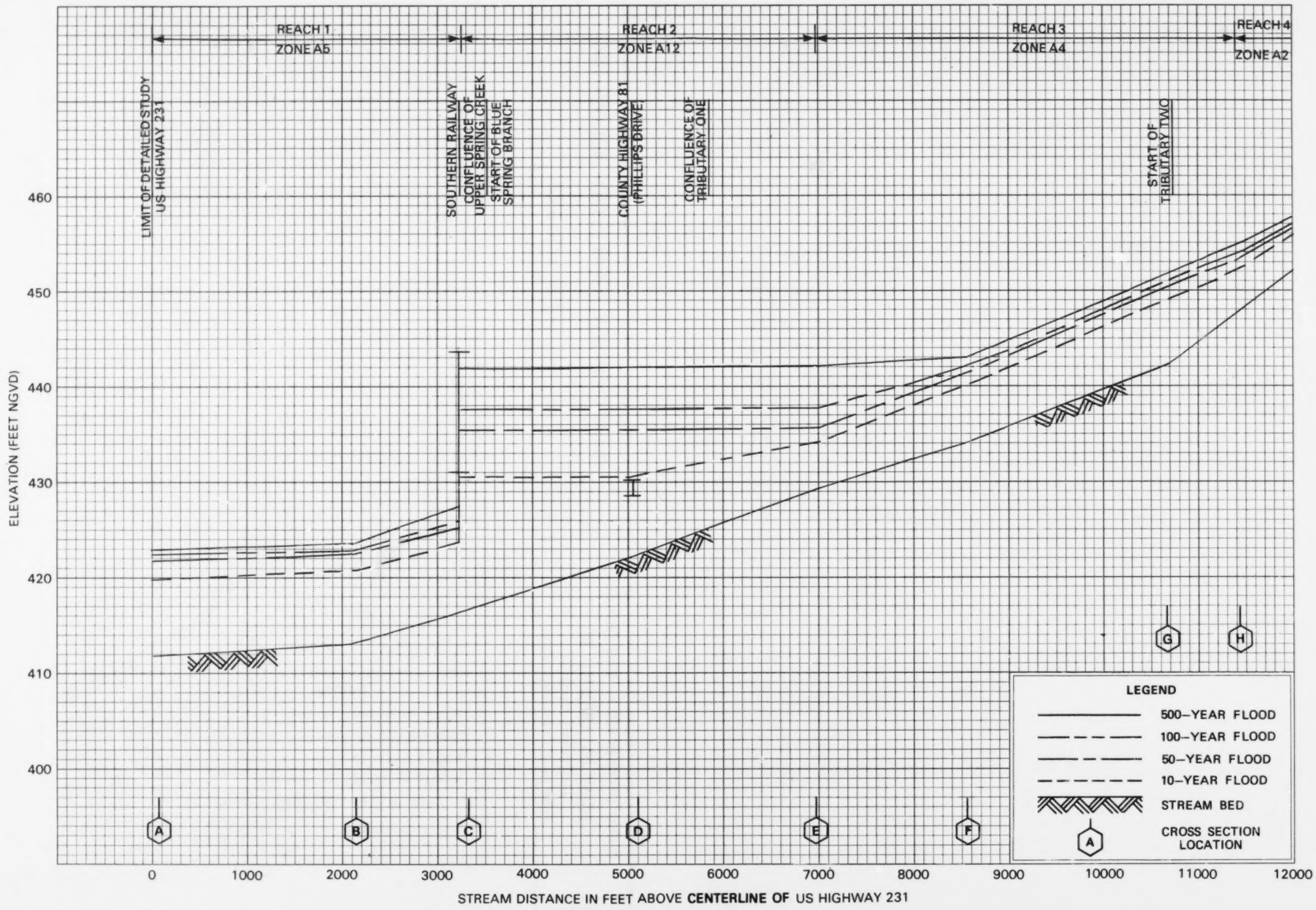
U. S. Geological Survey, Topographic Maps, 7.5-Minute Series: Vincent, Alabama, 1972 and Harpersville, Alabama, 1972.



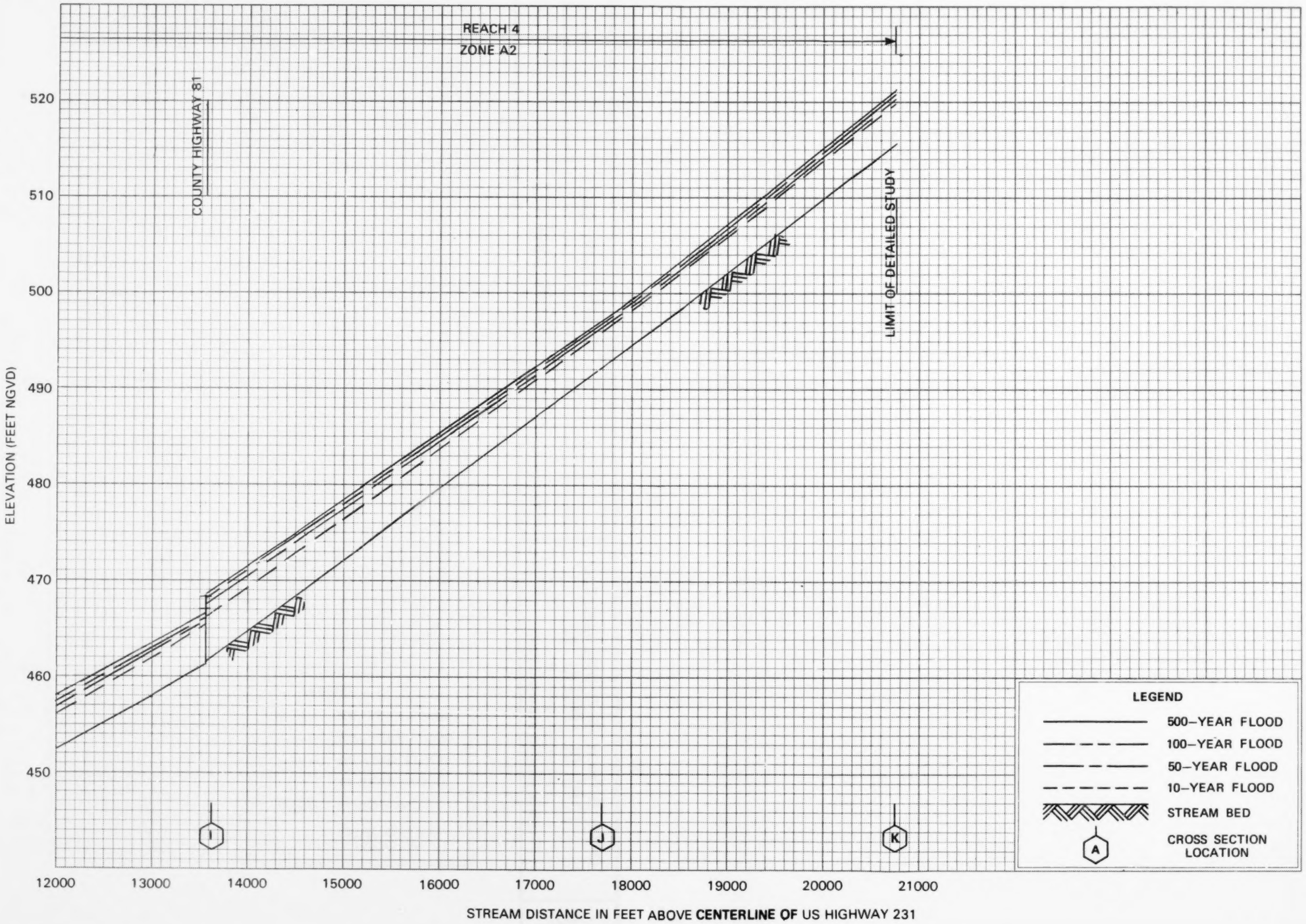
FLOOD PROFILES

SPRING CREEK-BLUE SPRING BRANCH-TRIBUTARY TWO

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF VINCENT, AL
(SHELBY, TALLADEGA AND ST. CLAIR COUNTIES)

01P



FLOOD PROFILES

SPRING CREEK-BLUE SPRING BRANCH-TRIBUTARY TWO

FEDERAL EMERGENCY MANAGEMENT AGENCY
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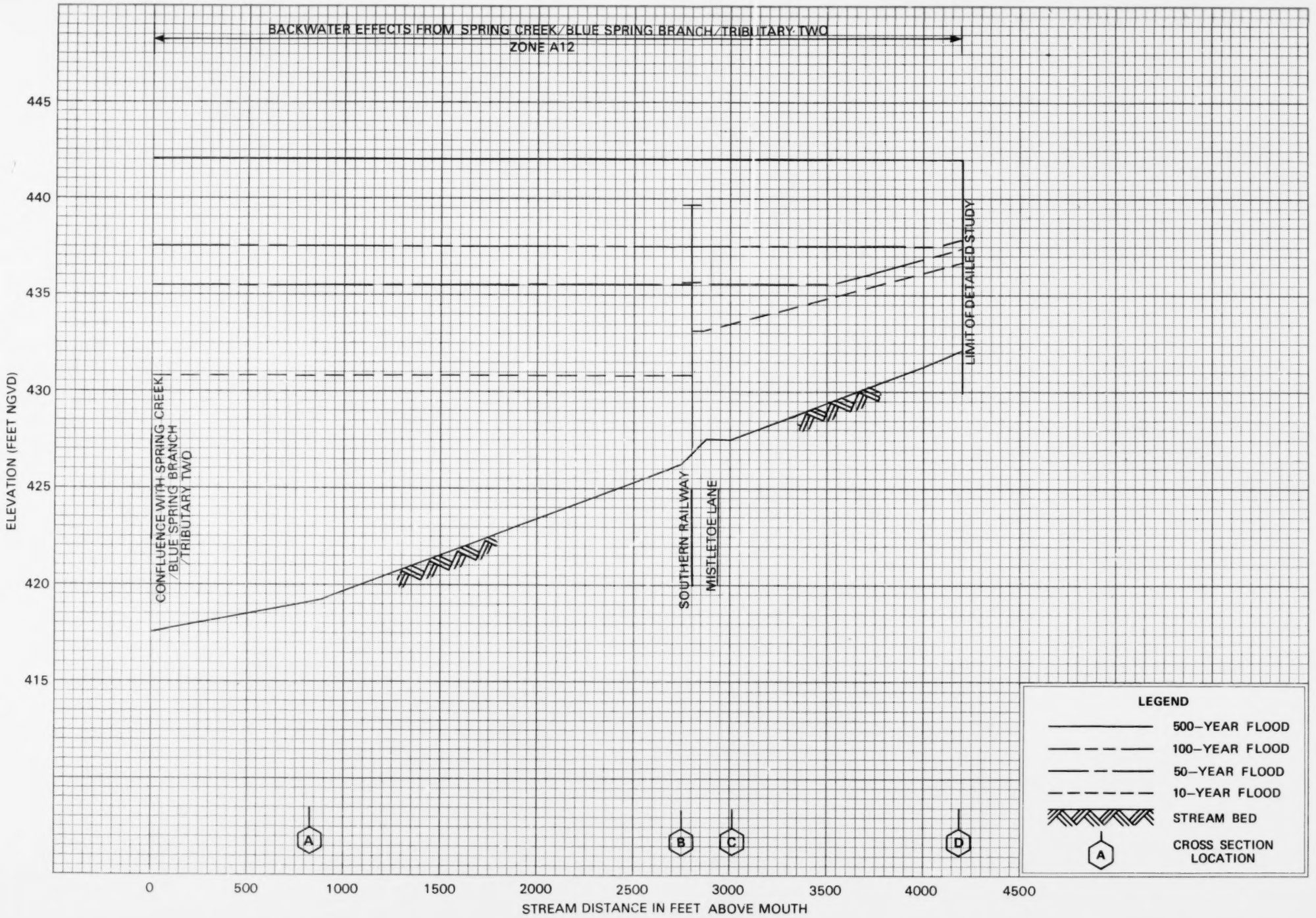
02P



FLOOD PROFILES

UPPER SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF VINCENT, AL
(SHELBY, TALLADEGA AND ST. CLAIR COUNTIES)

03P